INVERTER FUSION LTD

i-TECH AC/DC 250

Digital AC/DC TIG Welding Machine

User Manual

Do not attempt to set up or operate this equipment until you have read & fully understood the contents of this manual. If you do not fully understand any of the instructions, please contact your supplier for further information & advice before beginning any welding procedure.

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1. General Description

- The i-TECH AC/DC 250 is a triple-functional machine which can be used as an MMA, AC TIG, or DC TIG (PULSE TIG) welder.
- All ferrous metals, titanium, stainless steel, aluminium and alloyed materials can be used for the full range of welding in all positions.
- The welding current is very consistent, and is adjustable on a continuous scale.
- It is compact and portable.
- The i-TECH AC/DC 250 uses a double inverter system, the ATMEGA SCM controlling system, and IGBT transistors.

2. Warranty

1. Your i-TECH AC/DC 250 welder is covered by a comprehensive 2 year return-to-base parts & labour warranty.
2. Improper use, abuse or any attempt to repair the product by an unauthorised third party will invalidate any warranty claim.
3. Any parts or consumables fitted or used in conjunction with the i-TECH AC/DC 250 which affect the equipment operation & which are deemed by Inverter Fusion Ltd to be of inferior quality or not fit for that purpose will be regarded as abuse and will invalidate the warranty claim.
4. The claimant is responsible for all carriage, insurance and transportation costs in returning the product to Inverter Fusion Ltd.
5. Upon receipt and inspection of the product, it will be repaired or replaced at the discretion of Inverter Fusion Ltd. In the event of a chargeable repair, or a repair being required that is not considered to be a warranty issue, the claimant will be contacted for further instructions.
6. Following the completion of any authorised warranty claim work, the product will be returned to the claimant at the cost of Inverter Fusion Ltd (UK only).

3. Safety

There are inherent safety issues whilst welding so please ensure you read this manual carefully before commencing operations and follow the safety guidelines below to protect yourself and others from injury:

1. Whilst welding, ensure that you are working in a well ventilated area to avoid breathing in smoke & fumes.
2. Always wear a suitable welding mask/helmet, welding gloves & protective clothing whilst welding.
3. Never look at the welding arc when not wearing a welding mask or helmet.
4. Never touch the work piece with bare hands whilst it is still hot.
5. When appropriate use a suitable welding screen or curtain to protect other people.
6. Do not weld near flammable materials or combustible liquids or gases.
7. Ensure the earth return is connected appropriately to prevent danger of electric shock.
8. Never touch moving parts on the machine, such as the fan, and ensure all doors, panels and covers are closed and in place during operation.
9. Magnetic fields produced by the welder during operation may affect cardiac pacemakers — *pacemaker users should consult a doctor before welding.*

4. Technical Specifications

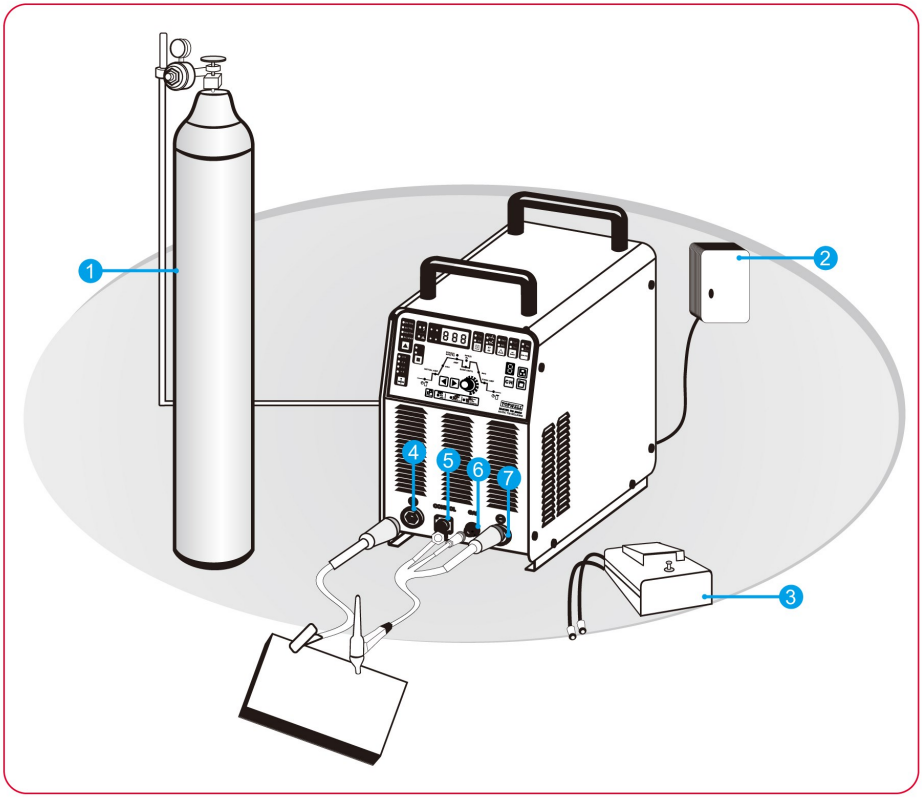
Input Voltage:		1 phase 220~240V ±10%, 50/60Hz
MMA	Rated No-load Voltage	70V
	Rated Output Current	250A
	Rated Duty Cycle	60%
	Output Current Range	5-250A
DC TIG	Rated No-load Voltage	70V
	Rated Output Current	250A
	Rated Duty Cycle	60%
	Pulse Current Range	5-250A
	Base Current Range	5-250A
AC TIG	Rated No-load Voltage	70V
	Rated Output Current	250A
	Rated Duty Cycle	60%
	Pulse Current Range	20-250A
	Base Current Range	20-250A
	AC Frequency Range	20-200Hz
	AC Balance (SP Value)	-40 -- +40
	AC Bias Value	-50 -- +30

TIG	Current Up-slope Time	0.1-15S
	Current Down-slope Time	0.1-15S
	Pulse Frequency Range	0.2-20Hz
	Pulse Width Range	1-100%
	Gas Pre-flow Time	0.1-15S
	Gas Retard Time	0.1-15S
	Arc Start Mode	HF arc striking
	Arc Crater Mode	2T/4T
	TIG Torch	Gas-cooling
Efficiency		≥80%
Insulation Class		1
Protection Degree		IP21S
Gross Weight		30Kg
Dimension (mm)		550*230*390mm

5. Panel Layout

Item	Symbol	Description
1		Control panel
2		Output connectors
3		Power switch
4		Input power cable: 1~ phase 220-240V, 50/60Hz
5		Gas input connector
6	⏚	Ground/Earth connector NB. Not to be used for the welder earth clamp.

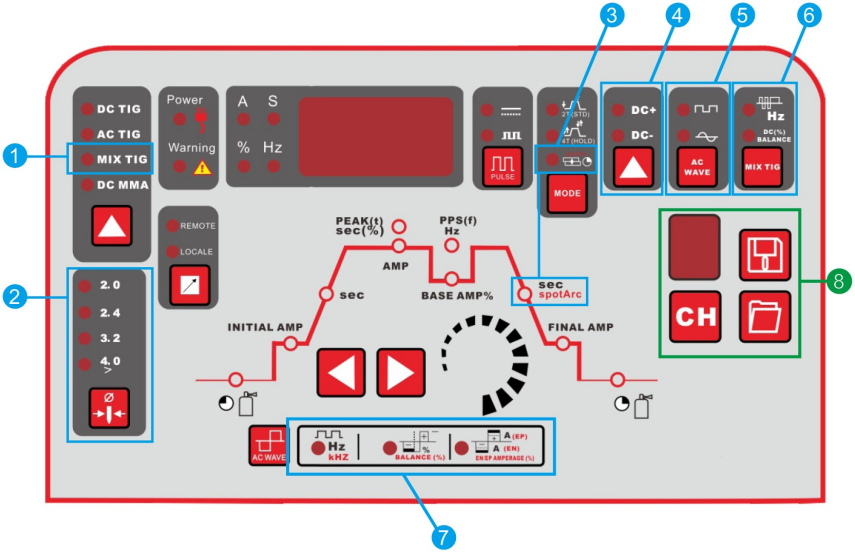
6. Connections



Item	Description
1	Gas Bottle
2	Power supply/phase 220~240V, 50/60Hz
3	Foot Pedal
4	Connection socket, “+” welding current - TIG: Connection for workpiece lead - MMA: Electrode holder or workpiece lead connection
5	Connection socket 5-pole: standard TIG torch control lead; foot pedal control lead
6	M16x1.5” connection Shielding gas connection (with yellow insulating cap) for TIG
7	Connection socket, “-” welding current - TIG: TIG welding torch connection - MMA: Electrode holder or workpiece lead connection

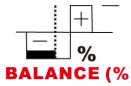
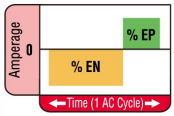
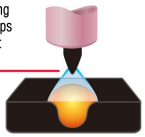
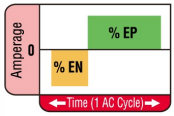
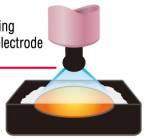
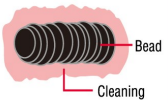
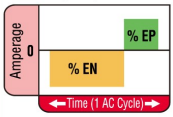
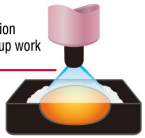
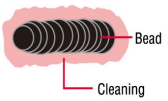
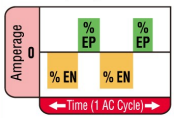
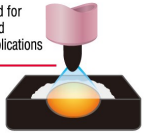
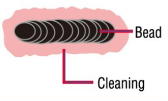
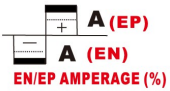
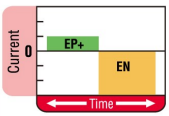
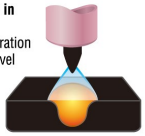
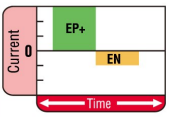
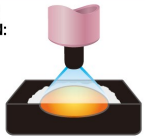
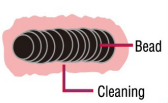
7. Special Features

7.1. Special Features, Definitions and Glossary



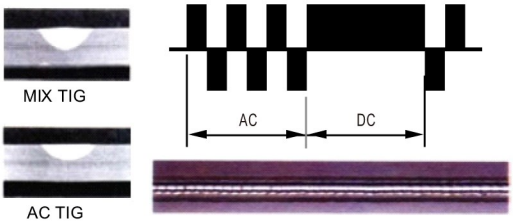
Item	Symbol	Description
1	MIX TIG	MIX TIG: In a cycle time that mixed with EN/EP output (AC TIG) and EN output (DC TIG).
2	2.0 2.4 3.2 4.0	Electrode Dia. selection
3	spotArc	Spot Welding Mode
4	DC+ DC-	DC +/- converter output arc-starting of AC TIG process MIX TIG process.
5	AC WAVE	AC Wave Type
7	Hz kHz BALANCE (%) A (EP) A (EN) EN/EP AMPERAGE (%)	AC Wave Control System: AC Frequency Control AC Balance Control Independent AC Amperage Control
8	CH	Memory with capacity of 10 sets parameters.

7.2. AC Wave Controls

Feature	Waveform	Effect on Bead	Effect on Appearance
AC Balance Control Controls arc cleaning action. Adjusting the % EN of the AC wave controls the width of the etching zone surrounding the weld. *Note: Set the AC Balance control for adequate arc cleaning action at the sides and in front of the weld puddle. AC Balance should be fine tuned according to how heavy or thick the oxides are.*  	51 ?99% EN  	Reduces balling action and helps maintain point Deep, narrow penetration 	Narrow bead, with no visible cleaning
	30 ?50% EN  	Increases balling action of the electrode Shallow penetration 	Wider bead and cleaning action 
AC Frequency Control Controls the width of the arc cone. Increasing the AC Frequency provides a more focused arc with increased directional control. *Note: Decreasing the AC Frequency softens the arc and broadens the weld puddle for a wider weld bead.* 	60 Cycles per Second  	Wider bead, good penetration ideal for buildup work 	Wider bead and cleaning action 
	120 Cycles per Second  	Narrower bead for fillet welds and automated applications 	Narrower bead and cleaning action 
Independent AC Amperage Control Allows the EN and EP amperage values to be set independently. Adjusts the ratio of EN to EP amperage to precisely control heat input to the work and the electrode. EN amperage controls the level of penetration, while EP amperage dramatically effects the arc cleaning action along with the AC Balance control.  	 	**More current in EN than EP:** Deeper penetration and faster travel speeds 	Narrow bead, with no visible cleaning
	 	**More current in EP than EN:** Shallower penetration 	Wider bead and cleaning action 

7.3. MIX TIG Control

The AC current can get a very good clearance, while the DC current can get a deeper penetration. Using the MIX TIG you can get an excellent Arc Concentration; this can be carried out on thin and thick plates.



Advantages of MIX TIG:

1) Nice weld appearance; deep penetration

2) Excellent Arc Concentration

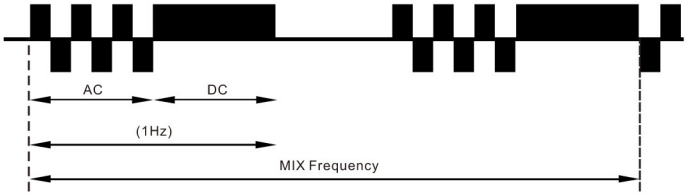
3) Substantially reduces electrode consumption

MIX TIG Frequency (Hz):

MIX TIG cycle time:
1 second.

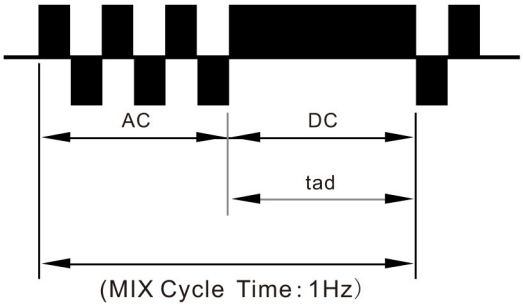
Adjustable range:
0.1-10Hz.

MIX TIG Balance (DC) %:
DC Balance (%) = (tad/Tmix) x 100

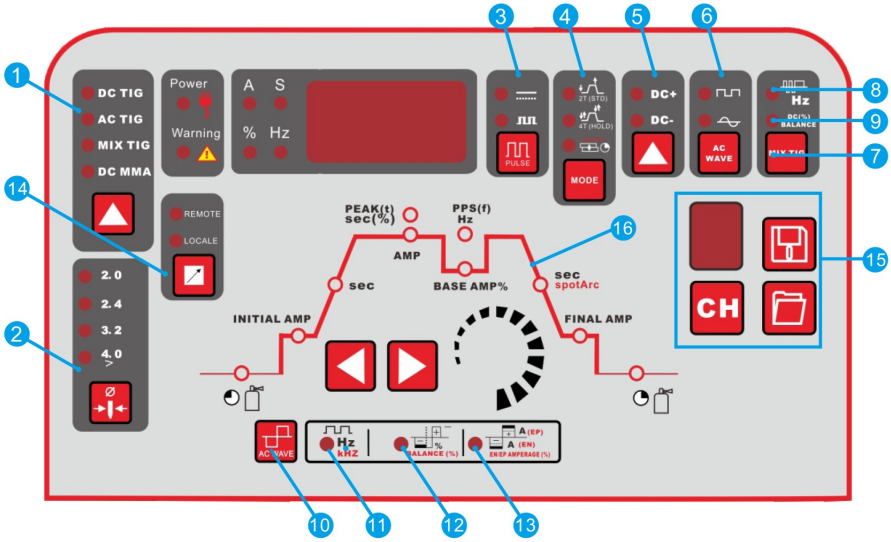


MIX TIG Balance (DC) %:

DC Balance (%) = (tad/Tmix) x 100

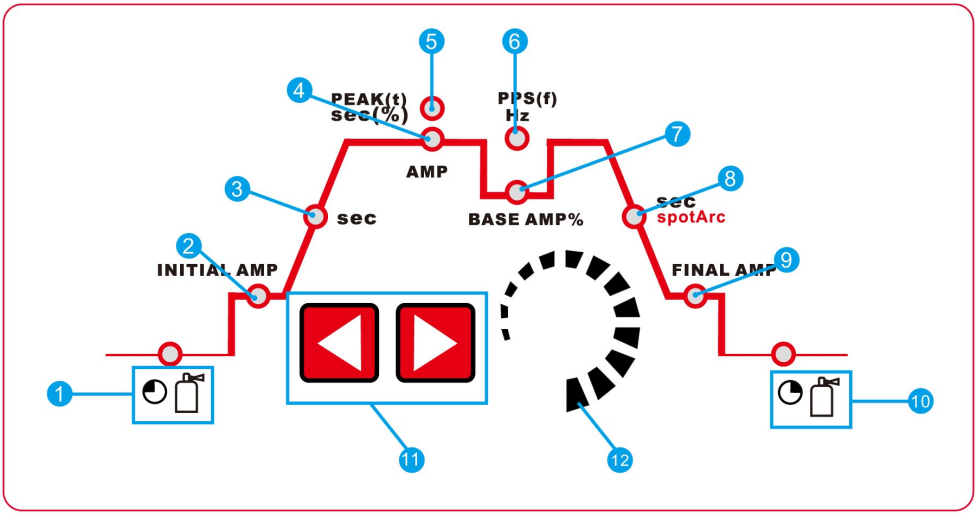


7.4. Glossary



Item	Symbol	Description
1	DC TIG AC TIG MIX TIG DC MMA	Process Selection
2	2.0 2.4 3.2 4.0 >	Tungsten Electrode Dia. From 2.0mm to >4.0mm
3	PULSE	Pulse ON/OFF selection.
4	2T (STD) 4T (HOLD) spotArc MODE	2T/4T holding mode or Spot Welding mode selection

Item	Symbol	Description
5		DC +/- converter output arc-starting of AC TIG process MIX TIG process.
6		Select the AC wave type: square wave or sine wave.
7		MIX TIG adjusting
8		MIX TIG: Pulse Frequency.
9		MIX TIG:DC output time (DC Balance).
10		Push to select AC Freq./AC Balance/Independt EN/EP Amperage for adjusting.
11		AC Frequency.
12		AC Balance.
13		Indepedent AC Amperage Control (EN/EP Balance %).
14		Remote: used for foot pedal or Remote torch. Local: adjusted Currents by face panel.
15		Memory with capacity of 10 sets parameters.
16		Function sequence (see next chapter)



Item	Symbol	Description	
1		Gas pre-flow time (TIG) Absolute setting range 0.1 s to 5.0 s (0.1 s increments).	
2	INITIAL AMP	Ignition current (TIG) Percentage of the main current. Setting range 1 % to 100 % (1 % increments).	Hotstart current (MMA) Percentage of the main current. Setting range 1 % to 150 % (1 % increments).
3	sec	Up-slope time (TIG) Setting ranges: 0.00 s to 20.0 s (0.1 s increments). The up-slope time can be set separately for non-latched and latched.	Hotstart time (MMA) Setting ranges: 0.00 s to 5.0 s (0.1 s increments).
4	AMP	Main current (TIG) / pulse current I min to I max (1 A increments)	Main current (MMA) I min to I max (1 A increments)
5	PEAK(t) sec(%)	Pulse time Pulse time setting range: 0.01 s to 9.99 s (0.01 s increments)	
		TIG pulses The pulse time applies to the main current phase (AMP) for pulses.	TIG AC Special The pulse time applies to the AC phase for AC special.
6	PPS(f) Hz	Pulse break time Pulse break setting range: 0.01 s to 9.99 s (0.01 s increments)	
		TIG pulses The pulse break time applies to the secondary current phase (AMP%)	TIG AC Special The pulse break time applies to the DC phase with AC special.
7	BASE AMP%	Secondary current (TIG) / pulse pause current Setting range 1 % to 100 % (1 % increments). Percentage of the main current.	

Item	Symbol	Description
8	sec spotArc	Down-slope time (TIG) 0.00 s to 20.0 s (0.1 s increments). The down-slope time can be set separately for non-latched and latched.
9	FINAL AMP	End-crater current (TIG) Setting range 1 % to 100 % (1 % increments). Percentage of the main current.
10		Gas post-flow time (TIG) Setting ranges: 0.1 s to 20.0 s (0.1 s increments).
11		Select welding parameters button This button is used to select the welding parameters depending on the welding process and operating mode used.
12		Select welding parameters button This button is used to select the welding parameters depending on the welding process and operating mode used.

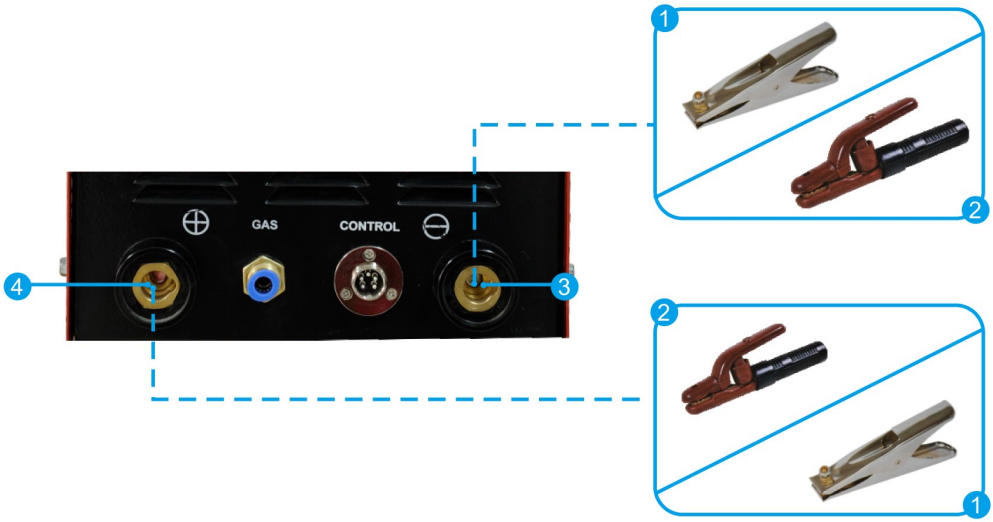
8. Method of Operation

Please ensure you follow these instructions whilst setting up your i-TECH AC/DC 250:

Operation: 1.1. MMA Connection

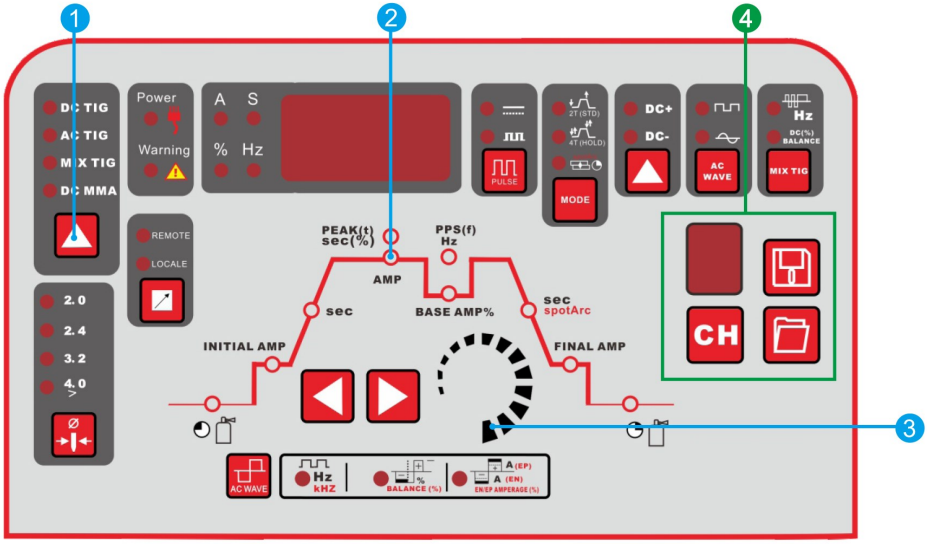
In the MMA process the ideal connection type is Negative Output Connector to Electrode Holder and Positive Output Connector to Earth Clamp.

Straight connection can also be used (Negative Output to the Earth Clamp). Remember the part connected to the positive will carry the most heat.



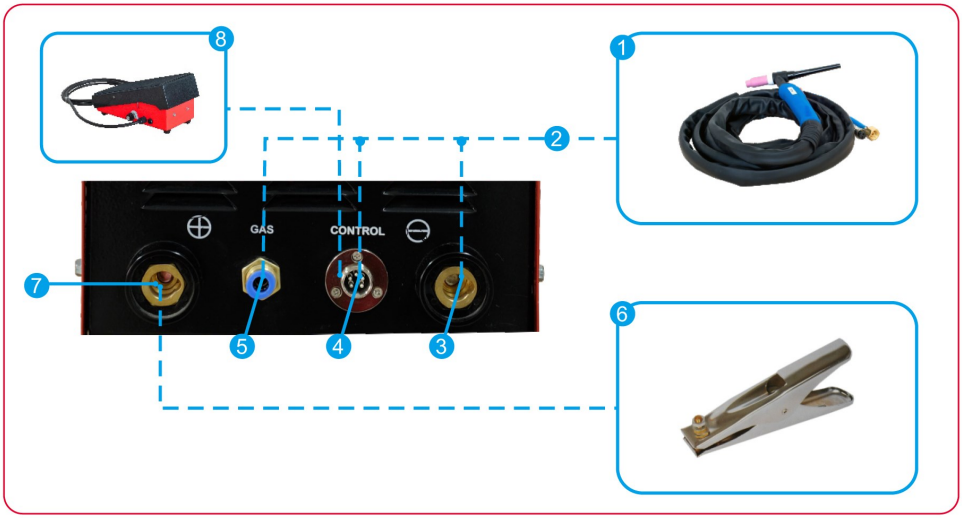
Item	Symbol	Description
1		Electrode holder
2		Workpiece
3	−	Connection socket, “-” welding current Workpiece lead or electrode holder connection
4	+	Connection socket for "+" welding current Electrode holder or workpiece lead connection

Operation: 1.2. MMA Process



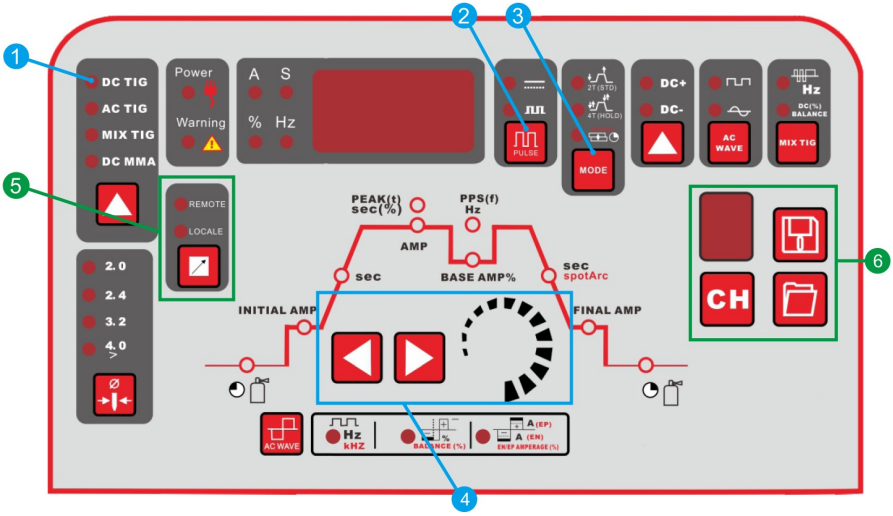
Item	Symbol	Description
1	▲	Process selection switch: DC MMA.
2	AMP	Main Current indicating lamp (AMP) on the face panel would be light.
3		Adjust the Encoder switch to proset/change the welding current.
4	CH	Memory is availabe for all the process.

Operation: 2.1. TIG Connection



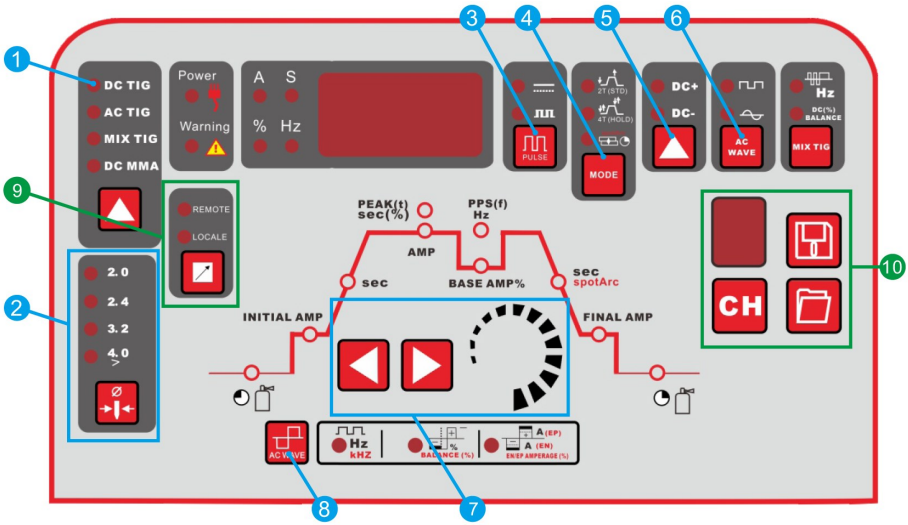
Item	Symbol	Description
1		Welding torch
2		Welding torch hose package
3	−	Connection socket, "-" welding current Welding current lead connection for TIG welding torch
4		Connection socket 5-pole: Standard TIG torch control lead Foot pedal control lead
5		M16X1.5" connecting nipple TIG welding torch shielding gas connection
6		Workpiece
7	+	Connection socket for "+" welding current Workpiece lead connection
8		Foot Pedal

Operation 2.2. DC TIG Process



Item	Symbol	Description
1	DC TIG	Select the welding process: DC TIG.
2	PULSE	Pulse ON/OFF selection.
3	MODE	2T/4T holding mode selection.
4		Select and adjust the welding parameters.
5	REMOTE LOCALE	Used to connect the foot-pedal.
6	CH	Memory is availabe for all the process.

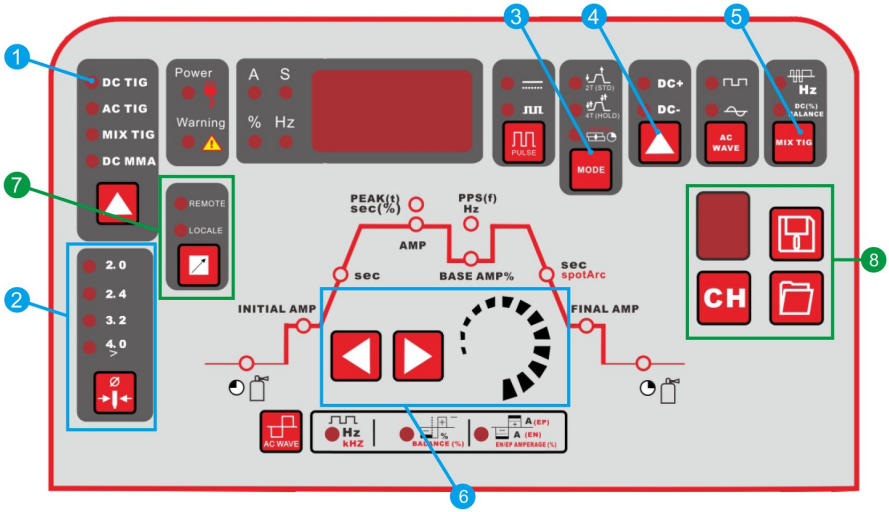
Operation: 2.3. AC TIG Process



Item	Symbol	Description
1	DC TIG	Select the welding process: AC TIG.
2	2.0 2.4 3.2 4.0 >	Select the Dia. of Tungster Electrode.
3	PULSE	Pulse ON/OFF selection.
4	MODE	2T/4T holding mode selection.
5		Arc-start position: DC+/DC-.
6	AC WAVE	Select the AC wave type: square wave or sine wave.

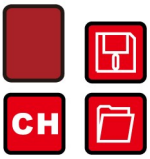
Item	Symbol	Description
7		Select and adjust the welding parameters.
8		Push to select AC Freq./AC Balance/Independt EN/EP Amperage for adjusting.
9		Used to connect the foot-pedal.
10		Memory is availabe for all the process.

Operation: 2.4. MIX TIG Process



Item	Symbol	Description
1	DC TIG	Select the welding process: AC TIG.
2	2.0 2.4 3.2 4.0	Select the Dia. of Tungster Electrode.
3	MODE	2T/4T holding mode selection.
4		Arc-start position: DC+/DC-.
5	MIX TIG	Select to adjust:MIX TIG Pulse Freq.MIX TIG DC Balance.
6		Select and adjust the welding parameters.
7	REMOTE LOCALE	Used to connect the foot-pedal.
8	CH	Memory is availabe for all the process.

Operation: 3.1. Memory



MEMORY is available for all MMA and TIG welding processes.

Recall previous settings from Memory:

1) Push to select the memory channel number.

2) Push to recall/use the stored settings.

It is also possible to adjust stored parameters and save the adjusted settings in the same memory channel or a new channel.

Store settings using Memory:

1) Select a memory channel to store current settings/parameters. (Do not push to re-save in the same channel).

2) Push to save the settings/parameters to this memory channel.

9. Caution

9.1. Working environment

1. Welding should be carried out in a relatively dry environment with a humidity of 90% or less.
2. The temperature of the working environment should be -10°C to +40°C.
3. Avoid welding in the open air unless sheltered from sunlight and rain, and never let rain or water infiltrate the machine.
4. Avoid welding in dusty areas or where corrosive chemical gases are present.
5. Avoid MIG welding in environments with a strong airflow.

9.2. Ventilation

The i-TECH AC/DC 250 contains an inner fan which cools it effectively, enabling it to work steadily for longer periods. To enable the fan to work efficiently, always ensure that the louvers on the front panel are uncovered and unblocked and that the minimum distance between the machine and other objects is 30cm.

9.3. Overheating protection

If the machine has become overheated because of continuous welding for long periods the overheat LED will light up and the overheat protection system will begin working, causing the machine to stop welding. If this occurs there is no need to restart the machine — once it has cooled down the LED will go out and welding can recommence.

10. Maintenance

1. Always use and store your i-TECH AC/DC 250 in a clean, dry environment.
2. Regularly check that the cables and leads are in good condition.
3. Regularly check that the gas hose is in good condition and has no cracks.

WARNING

Improper use, abuse or any attempt to repair the product by an unauthorised third party will invalidate any warranty claim.

Any parts or consumables fitted or used in conjunction with the i-TECH AC/DC 250 which affect the equipment operation & which are deemed by Inverter Fusion Ltd to be of inferior quality or not fit for that purpose will be regarded as abuse and will invalidate the warranty claim.

11. Troubleshooting

Fault	Cause	Remedy
The power on LED is not lit	No mains power available	Ensure that the machine is connected to a suitable live mains power source and is switched on
	The fuse in the plug is no longer working	Replace the fuse
The yellow LED light is lit	The machine has overheated because the working duty cycle has been exceeded	Stop welding for a while to allow the machine time to cool down. Ensure that the fan and output ducts are free from obstruction and that there is adequate ventilation space around the machine
No welding output	Welding leads are incorrectly fitted	Check that the leads are fitted to the correct sockets and that the earth return is connected to the work piece
MMA Welding operation is erratic or not as required	Incorrect welding current selected	Check that the current setting is correct for the selected electrode
	Faulty or damp electrode	Select an alternative electrode
Erratic or uncontrollable MMA welding arc	Faulty electrode holder or bad earth return connection	Check that the correct sized components are fitted and that the electrode holder is in good condition. Ensure that there is a good earth return connection with the work piece
MIG welding wire feed erratic	Incorrect wire feed roller	Check correct size wire feed roller is fitted
	Incorrect feed roller tension	Check feed roller tension
	Wire binding on reel	Check wire will easily feed from roll
	Nozzle blocked or wrong size	Check correct size nozzle is fitted in torch

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